# Curriculum Proposal

## MATH 16-17 #10

### Packet Contents

#### 1.1 Summary

### Course Modifications

#### 1.2 MATH 6061 Number Sense For Elementary and Middle Level Teachers (3 credits) to Number Sense For Teachers

#### 1.2 MATH 6062 Number Theory For Elementary And Middle Level Teachers (3 credits) to Number Theory For Teachers

#### 1.2 MATH 6200 Discrete Mathematics For Elementary And Middle Level Teachers (3 credits) to Discrete Mathematics for Teachers

#### 1.2 MATH 6500 Geometry In The Classroom For Elementary And Middle Level Teachers (3 credits) to Geometry In The Classroom For Teachers

#### 1.2 MATH 6600 Probability For Elementary And Middle Level Teachers (3 credits) to Probability For Teachers

### Program Modification

#### 1.5 Master of Science - Mathematics

#### 1.12 Signatures
BSU Curriculum Forms

Form 1

Curriculum Modification Summary

College: Arts and Sciences
Department: Mathematics and Computer Science
Proposer: Dr. Derek Webb
Proposer’s position: Chair of Department of Mathematics and Computer Science

Describe the modification(s) you propose, and how it (/they) will work to students' advantage. (This description and explanation will be included in Curriculum Report packets forwarded to the Faculty Senate.): Areas II and III of the MS in Mathematics are being updated. These areas are being reworded to more clearly state the intent of these requirements. In addition, some graduate course names are being changed to reflect the broader audience that they serve.

Modifications proposed (specify number of each):
1 (5 courses) Course Modification(s) (form 2)
_____ New Course(s) (form 3)
_____ Course Drop(s) (form 4)
1 Program Modification(s) (form 5)
_____ New Program(s) (form 6)
_____ Program Drop(s) (form 7)

The modifications affect (check):
_____ Liberal Education
_____ Undergraduate Curriculum
X Graduate Curriculum
_____ Teacher Licensure Program(s)
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Form 2

Course Modification Form

Current Course Number(s):
Undergraduate:
Graduate:
MATH 6061
MATH 6062
MATH 6200
MATH 6500
MATH 6600

Proposed Course Number(s), if different:
Undergraduate:
Graduate:

Current Course Title:
MATH 6061 NUMBER SENSE FOR ELEMENTARY AND MIDDLE LEVEL TEACHERS
MATH 6062 NUMBER THEORY FOR ELEMENTARY AND MIDDLE LEVEL TEACHERS
MATH 6200 DISCRETE MATHEMATICS FOR ELEMENTARY AND MIDDLE LEVEL TEACHERS
MATH 6500 GEOMETRY IN THE CLASSROOM FOR ELEMENTARY AND MIDDLE LEVEL TEACHERS
MATH 6600 PROBABILITY FOR ELEMENTARY AND MIDDLE LEVEL TEACHERS

Proposed Course Title, if different:
MATH 6061 NUMBER SENSE FOR TEACHERS
MATH 6062 NUMBER THEORY FOR TEACHERS
MATH 6200 DISCRETE MATHEMATICS FOR TEACHERS
MATH 6500 GEOMETRY IN THE CLASSROOM FOR TEACHERS
MATH 6600 PROBABILITY FOR TEACHERS

Current Course Description:
MATH 6061 Number sense is the ability to understand numbers, ways of representing numbers, relationships among numbers, and number systems, according to the National Council of Teachers of Mathematics. This course focuses on these issues by examining problems with quantitative information and exploring reasonable solutions. Prerequisite: Teaching license or teaching position or consent of instructor.

MATH 6062 Analysis of activities and mathematical games to understand the underlying mathematics. Students also study the division algorithm, prime and composite numbers, greatest common divisor, least common multiple, the Euclidean algorithm, mathematical induction, linear Diophantine equations, famous number theory conjectures, and additional elementary number theory topics. Prerequisite: Teaching license or teaching position.

MATH 6200 Topics include problem solving, the counting principle, combinations, permutations, graphs, Euler circuits, Hamiltonian paths, Pascal’s triangle, Venn diagrams, scheduling, and voting theory. Students are expected to use the concepts and methods of discrete mathematics to model and solve problems. Emphasizes instructional strategies to help all students learn. Prerequisite: MATH 6061.

MATH 6500 This course uses typical classroom materials to examine the Van Hiele model, 3-dimensional and 2-dimensional geometric shapes, and measurement concepts. Emphasizes instructional strategies, manipulatives, and tools to enhance student learning. Prerequisite: Teaching experience or consent of the instructor.
MATH 6600 Introduction to the terms and models of elementary probability. Emphasizes instructional strategies to help all students learn. Topics include definition of terms, the counting principle, event modeling, event analysis, probability determinations, empirical and theoretical probabilities, and use of simulations to analyze real world problems. Prerequisite: Teaching experience or consent of the instructor.

Proposed Course Description, if different:

Current Credits: All courses are 3 credits
Proposed Credits, if different:

Current Prerequisite(s):
Proposed Prerequisite(s), if different:

1) Reason(s) for change(s): Course names are being changed to reflect the broader audience that they serve.

2) May this modified course replace the current course for students remaining in the old curriculum? Yes ___X___ No _____ If not, please drop the current course and submit a new course form for the modification.

3) Do these modifications change any of the following? For all Yes answers, please provide updated information on the next page.
   - Student Learning Outcomes Yes _____ No ___X___
   - Major Content Areas Yes _____ No ___X___
   - Projected Maximum Class Size (Cap) Yes _____ No ___X___

4) Current Course fee(s) per student: $ 0.00
   for:
   Proposed Course fee(s) per student, if different: $
   for:

5) Service Areas:
   This course is a requirement or an elective in the programs/areas listed below. To locate where this course appears please search the online catalog, as follows:
   a) go to http://www.bemidjistate.edu/academics/catalog/ and choose the most recent catalog(s),
   b) click on “Areas of Study, and Course Descriptions,”
   c) click on “PDF of Entire Catalog” in upper right,
   d) press Ctrl F, and enter the prefix and number of the course(s) from this form.

   Non-licensure programs:

   Teacher Licensure programs:

   Liberal Education:
The above “service area” programs/departments were notified of this modification on ________ (date) by __________________ (mail, email, or phone).

Please check one of the items below:

______ No comments were received from other programs or departments within one week of the notification.

______ Comments were received within one week of the notification, and are attached.
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Form 5

Program Modification Form

Program to be modified: Master Of Science in - Mathematics

List all proposed change(s): Areas II and III of the MS in Mathematics are being updated.

Reason(s) for the change(s): Areas II and III of the Master Of Science in - Mathematics are being reworded to more clearly state the intent of these requirements. Further clarity is given as to which courses are and are not allowed for these areas.

Note: In order to avoid hidden prerequisites, if a course is being dropped from this program (but not from the entire curriculum), please check for which remaining courses may include this dropped course as a prerequisite. Course prerequisites may be found in the online catalog (http://www.bemidjistate.edu/academics/catalog/). Remedies for hidden prerequisites may be found under Curriculum Forms at (http://www.bemidjistate.edu/faculty_staff/faculty_association/forms/).

Note: If a course from another department/program was either added to or dropped from this program, please notify the chair/coordinator of that course's department/program and indicate the following: The course’s home department/program was notified of the addition or dropping of their course(s) on ________ (date) by __________________ (mail, email, or phone).

Please check one of the items below:

_____ No comments were received from other programs or departments within one week of the notification.

_____ Comments were received within one week of the notification, and are attached.

Note: If this is a joint program, the signatures of both department chairs (and both deans, if different colleges) must be provided.

Alert: Attach a copy of the current program showing the marked changes.

Please copy the current program from the online catalog (http://www.bemidjistate.edu/academics/catalog/) and paste it into Word. Then use either the Track Changes feature under Tools, or the underline and strikethrough Font feature under Format. (Please note that the Track Changes feature may be easily switched on and off by holding down the Ctrl+Shift+E keys.)
Master Of Science - Mathematics

This degree is intended for middle level and secondary school teachers of mathematics. The focus is on providing greater subject depth and advanced instructional methodologies. Students are offered a curriculum which is appropriate to both their individual needs and their needs relating to classroom instruction.

Note: For Professional Education Cognate Area in Mathematics, see "Professional Education: M.S.–Education."

Preparation Requirements

Applicants should have a licensed undergraduate teaching major or minor in mathematics.

University Requirements

See Section IV. Policies and Procedures for degree requirements.

Course Work Requirements

Note: Required electives need to be selected so that at least 165 credits in the program are at the 6000 level. (Math 6980 does not count toward this requirement.)

I. Required Education Core

- **ED 6100** Educational Research I (3 credits)
- **ED 6107** Advanced Educational Psychology (3 credits)
- **MATH 6050** Assessment in the Mathematics Classroom (3 credits)

Subtotal 9 Credits

II. Required Mathematics Elective Courses

Note: Asterisked (*) courses have prerequisites not required in this program.

Select at least 12 credits from the following:

- **MATH 5240** Number Theory (3 credits)
- **MATH 5260** Mathematical Problem Solving (3 credits)
- **MATH 5310** Linear Algebra (4 credits)
- **MATH 5371** Modern Algebra (3 credits)
*MATH 5410 Introduction to Analysis (3 credits)
*MATH 5440 Introduction to Fractals and Chaos (3 credits)
*MATH 5470 Advanced Calculus (3 credits)
*MATH 5560 Classical and Modern Geometry (3 credits)
*MATH 5710 Mathematical Modeling (3 credits)
*MATH 5720 Numerical Methods (3 credits)
*MATH 5760 Topics in Applied Mathematics (3 credits)
*MATH 5820 History of Mathematics (3 credits)
*MATH 6350 Abstract Algebra for Secondary Teachers (3 credits)
*MATH 6550 Geometry for Secondary Teachers (3 credits)
*STAT 5631 Probability and Statistics I (4 credits)
*STAT 5632 Probability and Statistics II (3 credits)
STAT 5650 Probability and Statistics for Secondary Teachers (4 credits)
*STAT 5660 Statistics for the Health Sciences (3 credits)

Mathematics content courses numbered MATH 5210 to MATH 5820 as approved by advisor
Other mathematics content courses approved by advisor

Subtotal 12 Credits

Select at least 9 credits from the following list of possible courses:

MATH 5064 Number Concepts for Teachers (4 credits)
MATH 5065 Mathematical Foundations for Teachers (3 credits)
MATH 5066 Geometry and Technology in the Mathematics Classroom (4 credits)
MATH 5067 Data Investigations, Probability and Statistics for Teachers (4 credits)
MATH 6061 Number Sense for Teachers (3 credits)
MATH 6062 Number Theory for Teachers (3 credits)
MATH 6200 Discrete Mathematics for Teachers (3 credits)
MATH 6500 Geometry in the Classroom for Teachers (3 credits)
MATH 6600 Probability for Teachers (3 credits)
CS 6420 Classroom Integration of Computer Software (3 credits)
Other mathematics pedagogy courses approved by advisor

Subtotal 9 Credits

The following courses may not be used to fulfill this requirement:
ED 6100 Educational Research (3 credits)
ED 6107 Advanced Educational Psychology (3 credits)
MATH 6050 Assessment in the Mathematics Classroom (3 credits)
IV. Required Portfolio Evaluation and Research

Note: Consult with advisor before registering for MATH 6980.

MATH 6055 Pedagogical Portfolio Evaluation (0 credits)
MATH 6980 Graduate Research Paper (2 credits)

Subtotal 2 Credits

Total Semester Credits Required for Degree 32 Credits

Competency Requirement

Computer Application of Statistics: Completion of MATH 6050 Assessment in the Mathematics Classroom, with a grade of "B" or better, or the equivalent as approved by the department.

Written Examination

All major programs require satisfactory completion of a final written examination, which needs to be successfully completed prior to scheduling the oral examination. Please consult with your academic advisor for requirements specific to your area of study.
Master Of Science - Mathematics

This degree is intended for middle level and secondary school teachers of mathematics. The focus is on providing greater subject depth and advanced instructional methodologies. Students are offered a curriculum which is appropriate to both their individual needs and their needs relating to classroom instruction.

Note: For Professional Education Cognate Area in Mathematics, see "Professional Education: M.S.–Education."

Preparation Requirements

Applicants should have a licensed undergraduate teaching major or minor in mathematics.

University Requirements

See Section IV. Policies and Procedures for degree requirements.

Course Work Requirements

Note: Required electives need to be selected so that at least 15 credits in the program are at the 6000 level. (Math 6980 does not count toward this requirement.)

I. Required Education Core

ED 6100 Educational Research I (3 credits)
ED 6107 Advanced Educational Psychology (3 credits)
MATH 6050 Assessment in the Mathematics Classroom (3 credits)

Subtotal 9 Credits

II. Required Mathematics Elective Courses

Note: Asterisked (*) courses have prerequisites not required in this program.

Select at least 12 credits from the following
*MATH 5240 Number Theory (3 credits)
*MATH 5260 Mathematical Problem Solving (3 credits)
*MATH 5310 Linear Algebra (4 credits)
*MATH 5371 Modern Algebra (3 credits)
*MATH 5410 Introduction to Analysis (3 credits)
*MATH 5440 Introduction to Fractals and Chaos (3 credits)
*MATH 5470 Advanced Calculus (3 credits)
*MATH 5560 Classical and Modern Geometry (3 credits)
*MATH 5710 Mathematical Modeling (3 credits)
*MATH 5720 Numerical Methods (3 credits)
*MATH 5760 Topics in Applied Mathematics (3 credits)
*MATH 5820 History of Mathematics (3 credits)
*MATH 6350 Abstract Algebra for Secondary Teachers (3 credits)
*MATH 6550 Geometry for Secondary Teachers (3 credits)
*STAT 5631 Probability and Statistics I (4 credits)
*STAT 5632 Probability and Statistics II (3 credits)
STAT 5650 Probability and Statistics for Secondary Teachers (4 credits)
*STAT 5660 Statistics for the Health Sciences (3 credits)

Other mathematics content courses approved by advisor

Subtotal 12 Credits

Select at least 9 credits from the following list of possible courses:

MATH 5064 Number Concepts for Teachers (4 credits)
MATH 5065 Mathematical Foundations for Teachers (3 credits)
MATH 5066 Geometry and Technology in the Mathematics Classroom (4 credits)
MATH 5067 Data Investigations, Probability and Statistics for Teachers (4 credits)
MATH 6061 Number Sense for Teachers (3 credits)
MATH 6062 Number Theory for Teachers (3 credits)
MATH 6200 Discrete Mathematics for Teachers (3 credits)
MATH 6500 Geometry in the Classroom for Teachers (3 credits)
MATH 6600 Probability for Teachers (3 credits)

Other mathematics pedagogy courses approved by advisor

Subtotal 9 Credits

IV. Required Portfolio Evaluation and Research
Note: Consult with advisor before registering for MATH 6980.

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MATH 6980 Graduate Research Paper (2 credits)

Subtotal 2 Credits
Total Semester Credits Required for Degree 32 Credits

**Competency Requirement**

Completion of MATH 6050 Assessment in the Mathematics Classroom, with a grade of "B" or better, or the equivalent as approved by the department.

**Written Examination**

All major programs require satisfactory completion of a final written examination, which needs to be successfully completed prior to scheduling the oral examination. Please consult with your academic advisor for requirements specific to your area of study.
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Form 8

Signatures

Dr. Derek Webb / Chair of Mathematics Department and Computer Science Department / 10.17.2016
Proposer / Title / Date

Dr. Derek Webb / Chair of Mathematics Department and Computer Science Department / 10.17.2016
Chair or Director / Department or Program / Date
Note: "All departmental recommendations [on curriculum] must be reviewed and approved by the department's faculty."--IFO/MnSCU Master Agreement 2009-2011, 20.A.3 (p. 80).

Dr. Colleen Greer / Dean of College of arts and Sciences / 10.27.2016
Dean / College / Date

[Note: at this point, packet goes to Academic Affairs Office.]